

B. N. Mandal University, Laloonagar, Madhepura

Details of theory & Sessional Papers code of 2nd Year B. Tech. Course

Branch: ELECTRICAL ENGINEERING

| Sl. No. | Subject | Subject Code | Branch Code | L | T | P | Th. Exl. | Th. Int. | Sessional |
|---------|----------------------------------------------|--------------|-------------|---|---|---|----------|----------|-------------------------------------------------|
| 01 | Mathematics-III | MA-III | EE-201 | 3 | 1 | 0 | 70 | 30 | ----- |
| 02 | Numerical Methods & Computational Techniques | NMCT | EE-202 | 2 | 1 | 3 | 70 | 30 | Numerical Methods & Computational Techniques 50 |
| 03 | Basic electronics | BE | EE-203 | 2 | 1 | 3 | 70 | 30 | Basic electronics 50 |
| 04 | Electrical machine-I | EM-I | EE-204 | 3 | 0 | 3 | 70 | 30 | Electrical machine 100 |
| 05 | Digital electronics | DE | EE-205 | 2 | 1 | 3 | 70 | 30 | Digital electronics 50 |
| 06 | Object oriented programming | OOP | EE-206 | 2 | 1 | 3 | 70 | 30 | Object oriented programming 50 |
| 07 | Electrical machine-II | EM-II | EE-207 | 3 | 0 | 0 | 70 | 30 | Electrical machine II 100 |
| 08 | Power system-I | PS-I | EE-208 | 3 | 0 | 0 | 70 | 30 | |

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NUMERICAL METHOD & COMPUTATIONAL TECHNIQUE (CSE/EE/IT/CF/ECE/IT)

BRANCH CODE:EE-202

L-T-P: 2-1-3

FIRST TERM

1. INTRODUCTION TO COMPUTER LANGUAGE:

Machine language, assembly language, high level language, compilers, problem solving using computer Algorithm, flowchart, examples lecture-03

2. C/C++ PROGRAMMING:

Constants & variables, arithmetic expression, i/o statement, specification statement, control statement, subscripted variables, logical expression, function and subroutines, examples of programming should include numerical as well as non numerical applications, matrix operation searching, sorting. lecture-21

SECOND TERM

3. ITERATIVE TECHNIQUE FOR SOLUTION OF EQUATION:

i. SOLUTION OF NON LINEAR EQUATION-simple iteration scheme, bisection method, regula-falsi method, Newton-Raphson method, secant method, their rates of convergence, order of errors etc. lecture-12

ii. SOLUTION OF LINEAR EQUATION-Gaussian elimination, matrix inversion by Gaussian method, computation of determinants, Jacobi and Gauss-Seidal iteration method.

Lecture-06

4. POLYNOMIAL APPROXIMATION: interpolation, several form of interpolating polynomials like Lagrangian interpolation of polynomial and Newtons forward and backward difference formula, curvefitting(least square) lecture-04

5. NUMERICAL INTEGRATION: Trapezoidal method, Simpsons' rule($1/3^{rd}$ and $3/8^{th}$) order of errors in integration. lecture-04

6. SOLUTION OF INITIAL VALUE PROBLEMS: Euler's method, Runge-kutta second order and fourth order methods (without proof), solution of boundary value problem-finite difference method. Lecture-05

TEXT BOOK:

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VP 02 18/11/15
VP 02 19/11/15
VP 02 20/11/15
VP 02 21/11/15
VP 02 22/11/15
VP 02 23/11/15
VP 02 24/11/15

1. NUMERICAL METHODS FOR SCIENTIFIC FOR ENGINEERING COMPUTATIONS BY M.R. JAIN, P. INGAR AND R.K. JAIN, NEW AGE INTERNATIONAL PUBLISHERS, NEW DELHI

2. INTRODUCTORY METHOD OF NUMERICAL ANALYSIS BY S.S. SAstry, PHI PVT. LTD.

REFERENCE BOOKS

1. NUMERICAL ANALYSIS IN ENGINEERING BY RAMA B. BHAT, S. CHAKRAVARTY, NAORSA PUBLISHING HOUSE

2. ADVANCED ENGINEERING MATHEMATICS BY E. KREYSZIG, 8th EDITION BY JOHN WILEY & SONS, NEW YORK

CT LAB

WORKING IN WINDOWS ENVIRONMENT, FORTRAN 77 PROGRAMMING BASED ON SYLLABUS

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Subject: Basic Electronics

Branch Code: EE-203

(ECE/CSE/EE/ME)

L-T-P: 2-1-3

First Term

1. **PN junction diode:** Semiconductor, Depletion layer, barrier potential, forward and reverse breakdown voltage, PIV, characteristics of PN junction diode, knee voltage, ideal PN junction, junction capacitance, breakdown diode (zener diode). Lecture 1
2. **Rectifiers and filters:** Half wave and full wave rectifiers (center tapped and bridges), regulation factor, ripple factor, elementary theory of filter, L, C, L-C, and π filters. Clipping and clamping circuits, voltage multiplier. Lecture 2
3. **BJT introduction:** Basic theory and operation of PNP and NPN transistors, characteristics of CE and CC configurations and determination of α , β , γ and their relations. Lecture 3

Second Term

4. **Biasing:** Base bias, emitter feedback bias, voltage divider bias, load line, operation, incremental analysis using h-model. Lecture 4
5. **FET:** Introduction, operation, JFET parameters, JFET characteristics, JFET amplifiers. **MOSFET:** Introduction, operation, MOSFET parameters. Lecture 5
6. **Feedback amplifiers:** Theory of feedback amplifier, positive and negative feedback, feedback topologies, feedback amplifiers. Lecture 6
7. **Integrated circuits:** Characteristics of ideal op-amp. Application as inverting, non-inverting amplifiers, summer, difference, differentiator, integrator. Lecture 7
8. **Principle and applications of SCR and UJT.** Lecture 8

Text Books:

1. Electronic devices and circuits theory by Boylestad and Nashelsky, Pearson.
2. Electronic principles by Albert Malvino and Davis J Bates, TMH.
3. Art of Electronics by Paul H Horowitz.

Reference:

1. Introduction to electronic circuit design by Spencer, Pearson.
2. Device electronics for integrated circuits by Muller and Kamins with Masun Chan, Wiley eastern edition.
3. Principles of electronics by V K Mehta and Rohit Mehta, S Chand.
4. Electronic circuit and system by R J Smith, Wiley.

Basic Electronics Lab:

1. Introduction to DMM (Digital multimeter)
2. Introduction to passive components (resistor, capacitor, and inductor)
3. Introduction to CRO- time period measurement, study of different wave forms, measurement of frequency of sinusoidal waveforms by Lissajou's figure.
4. Introduction to connectors- multi strand wires and single strand wires and bread boards.
5. Study of output characteristics of diode, BJT, FET, UJT, SCR.
6. Application of diodes, BJT, FET, UJT and SCR, clipping and clamping, rectification, RC coupled CE and CS-FET amplifiers, relaxation oscillators.
7. Application of μA 741 inverting amplifiers, summer amplifiers, difference amplifiers, integrator and differentiator.

Text Book:

Lab manual by Maheshwari, PHI

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Amit, Virendra, Anil, etc.

Subject: Electrical Machines-I

Branch Code: EE 204

(EE/ECE)

L-T-P: 3-0-3

First Term

1. DC Generator: Constructional Feature and types of D.C. Machines, Types of armature winding, Action of Commutator, Principle of operation of D.C. Generator, Induced EMF, Armature reaction, Commutation, Compensating Winding and Inter poles, External and Internal Characteristics of D.C. Generator, Critical Resistance, Critical speed. Lecture 10.
2. D.C. Motor: Principle of D.C. Motors, Back EMF, Torque and Speed characteristic of D.C. Motors, Losses and efficiency. Lecture 6
3. Single Phase Transformer: Basic Principle, Types and Construction of Single Phase Transformer, EMF equation, Equivalent circuits, phasor diagram, Losses and efficiency, Testing, Voltage Regulation, per unit system, Losses and Efficiency, parallel Operation of Single Phase Transformer. Lecture 10.

Second Term

1. Auto Transformer: working Principle, Saving of conductor, Advantage and Disadvantage of Auto Transformer. Lecture 4.
2. Three Phase Transformer: Introduction, Types, Phasor group, Parallel Operation of three phase Transformer, Cooling of Transformer. Lecture 4.
3. Three phase Induction Motor: Construction, Types and Principle of Operation of three phase induction Motors, Production of rotating magnetic field, slip, Equivalent Circuit and Phasor Diagram, Mechanical Power Developed, Maximum torque, Torque-slip characteristics, Losses and efficiency, Starting, Testing and speed control of 3-phase induction Motor Lecture 12

Text Book:

1. Electrical Machine by Samarjit Ghosh, Pearson Education Pvt. Ltd.
2. Electrical Machine by P.S. Bimbora, Khanna Publication.
3. Electrical Machine by Nagrath, I.J. and Kothari D.P. T.M.H.

Reference Book:

1. Electrical Machinery by Fitzgerald A.E. & Kingsley T.M.H.
2. Direct Current Machine by E.W. Dawsing

Electrical Machine I Lab

Practical Based On Syllabus



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Subject: Digital Electronics Branch Code: EE-205

(ECE/CSE/EE)

L-T-P: 2-1-3

First Term

1. **Digital principle:** Analog vs Digital, number system, computer codes, digital signals, waveforms, positive and negative logic, Logic Gate: basic, universal and others, truth table, logic function, chips, timing diagram, electrical analogy. Lecture 1-2
2. **Boolean laws and theorems:** Logic functions, conversion of logic functions into truth table and vice versa, SOP and POS forms of representation, min terms and max terms, simplification of logic functions by theorems and Karnaugh's map, don't care conditions, Design of special purpose computers and related practical problems. Lecture 3-4
3. **Analysis and synthesis of combinational logic circuits:** Adder and Subtractors, multiple choice, multiplexers, encoders, decoders, code converters, magnitude comparators, parity generator and checkers. Lecture 5-6
4. **Integrated circuit logic families:** RTL, DTL, TTL, CMOS, III, PL. Lecture 7-8

Second Term

5. **Sequential circuit blocks and latches:** flip-flops- rat-race condition, master slave and triggered, SR, JK, D & T flip flops, shift registers, counters- synchronous and asynchronous- design of ripple counter. Lecture 9-10
6. **Timing circuits:** Multivibrators: monostable and astable, timer: 555. Lecture 11
7. **Use of building blocks in designing larger systems** such as digital to analog converter (DAC) weighted resistor and $r-2r$, analog to digital converter (ADC) comparator, counter and stage. Lecture 12-13
8. **Memories:** Static and dynamic RAMs, ROM, EPROM, EEPROM. Lecture 14

Text books:

1. Digital systems principles and applications by Tecci, Widmar and Jain, Pearson.
2. Digital fundamentals by Floyd and Jain, Pearson.

Reference books:

1. Fundamentals of VHDL design by Stephen Brown and Zvenko Vraseseic, TMH.
2. Introduction to logic design with cd ROM by Alan B Marcovity, TMH.
3. Fundamentals of digital logic with Verilog design by Stephen Brown TMH.
4. Modern digital electronics by R P Jain TMH.

Digital Electronics Lab:

1. Realization of logic gates including the universal gates.
2. Realization of the Boolean algebra.
3. Realization of the different logic circuits.

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OBJECT ORIENTED PROGRAMMING (CSE/EE/ECE/CE/IT)

BRANCH CODE-EE-206

L.T.P. 2:1:3

FIRST TERM

1. INTRODUCTION TO C++

Object oriented technology, advantages of OOP, input-output in C++, tokens, keywords, identifiers, data types C++, derives data types, the void data types, type modifiers, typecasting, constant, operator, precedence of operators, strings lecture-02

2. CONTROL STRUCTURES

Decision making statements like if-else, nested if-else, goto, break, continue, switch case, loop statement like for loop, nested for loop, while loop, do-while loop lecture-11

3. FUNCTIONS:

Parts of function, user-defined functions, value-returning functions, void functions, value parameters, function overloading, virtual functions lecture-09

4. CLASSES AND DATA ABSTRACTION:

Structure in C++, class, build-in operations on classes, assignment operators and classes, classes scope, reference parameters and class objects, member functions, Accessor and Mutator functions, constructors, default constructor, destructors lecture-04

SECOND TERM

5. OVERLOADING & TEMPLATES:

Operator overloading, function overloading, function templates, class templates lecture-08

6. INHERITANCE:

Single and multiple inheritance, virtual base class, abstract class, pointer and inheritance, overloading, member function, lecture-05

7. POINTERS AND ARRAYS

Void pointers, pointer to class, pointer to object, the this pointer, void pointer, Arrays lecture-06

8. EXCEPTION HANDLING:

The keywords try, throw and catch, creating own exception classes, exception handling techniques (terminates the program, fix the error and continue, log the error and continue), stack unwinding. lecture-12

TEXT BOOKS:

1. THINKING IN C++, VOLUME 1 & 2 BRUCE ECKEL, CHUCK ALLISON,

2. MASTERING IN C++

REFERENCE BOOKS:

1. THE C++ PROGRAMMING LANGUAGE 3/E BY STROUSTRUP PERASON

2. BIG C++ BY CAY HORSTMANN, WILEY INDIA

PROGRAMMING LAB (OOP)

WRITING PROGRAMS USING CLASSES AND OBJECTS, CONSTRUCTORS AND DESTRUCTORS, INHERITANCE PROPERTIES, OVERLOADING OPERATORS, USE OF POINTERS LIST REPRESENTATION, PROGRAMS AND VIRTUAL FUNCTIONS, FILE HANDLING, I/O MANIPULATORS USING C++

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Subject: Electrical Machine-II

Branch Code: EE207

(EE)

L-T-P: 3-0-3

First Term

1. Synchronous Generator: Principle, Construction and types of synchronous machines, Methods of excitation, Armature windings, EMF Equation of Alternator, Armature reaction, testing (OC and SC test) Voltage Regulation, Phasor Diagram. Lecture:14
2. Two Reaction: Theory Modify Phasor Diagram, Power angle characteristics, Parallel operation, Effect of change of voltage supply and excitation on alternator connected to infinite bus, cooling of synchronous Generator. Lecture:8

Second Term

3. Synchronous motor: Principle of operation, equivalent circuit, effect of varying field current, V-curves, Inverted V-curves, Phasor diagram, starting of synchronous motors, Hunting, application. Lecture:8
4. Single phase induction motors: Introduction, Working principle, double revolving field theory, Equivalent circuit, Starting method and types of single phase induction motor, Application. Lecture:8
5. Special motors: Single phase Synchronous motor, Two Phase AC Servo motor, single phase series motor (universal motor), stepper motor, Permanent magnet DC motor, Application. Lecture:8

Text Books:

1. Electrical machines by Nagrath I.J. and Kothari D.P. TMH
2. Electrical machinery by Fitzgerald A.E. & Kingsley

Reference Books:

1. Electrical Machines by P.S. Bhimra, Khanna-Publication.
2. Electrical Machines by Samarjeet Ghosh, Pearson Education Pvt. Ltd.

Electrical Machine-II Lab

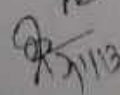
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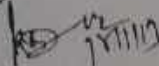


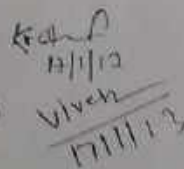

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